

Claims

[c1] WHAT IS CLAIMED:

1. An apparatus, comprising:

a first component adapted to be positioned in a subterranean hole;

a second component adapted to be positioned in said subterranean hole;

a detachable housing, at least a portion of which is clamped between said first and second components, said housing having at least one cavity formed therein; and at least one device positioned within said at least one cavity.

[c2] 2. The apparatus of claim 1, wherein said at least one device is comprised of a sensor.

[c3] 3. The apparatus of claim 1, wherein said at least one device is comprised of an electrical component.

[c4] 4. The apparatus of claim 1, wherein said at least one device is comprised of at least one sensor and at least one electrical component.

[c5] 5. The apparatus of claim 1, wherein said first and second components are threadingly coupled to one another.

- [c6] 6.The apparatus of claim 1, wherein said first component comprises at least one of a threaded pipe and a drill bit.
- [c7] 7.The apparatus of claim 1, wherein said second component comprises at least one of a threaded pipe and a drill bit.
- [c8] 8.The apparatus of claim 1, wherein said first and second components are sections of pipe.
- [c9] 9.The apparatus of claim 1, wherein an end surface of said first component and an end surface of said second component engage said housing.
- [c10] 10.The apparatus of claim 1, wherein said housing has a plurality of cavities formed therein.
- [c11] 11.The apparatus of claim 10, wherein at least one sensor is positioned in each of said plurality of cavities.
- [c12] 12.The apparatus of claim 10, wherein at least one electrical component is positioned in each of said cavities.
- [c13] 13.The apparatus of claim 10, wherein at least one sensor and at least one electrical component is positioned in each of said plurality of cavities.
- [c14] 14.The apparatus of claim 1, wherein said housing is positioned adjacent an exterior surface of said first component.

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- [c15] 15.The apparatus of claim 1, wherein said housing is positioned adjacent an interior surface of said first component.
- [c16] 16.The apparatus of claim 1, wherein said at least one cavity has at least one of a generally cylindrical configuration and a generally rectangular configuration.
- [c17] 17.The apparatus of claim 1, further comprising a cover plate positioned over said at least one cavity.
- [c18] 18.The apparatus of claim 1, further comprising at least one passageway extending from said at least one cavity to an external surface of said housing.
- [c19] 19.The apparatus of claim 10, further comprising an internal passageway formed in said housing that connects at least two of said plurality of cavities to one another.
- [c20] 20.The apparatus of claim 2, wherein said at least one sensor is comprised of at least one of a thermometer, a gyroscope, an accelerometer, a strain gauge, a barometer, a pressure sensor and a hall effect switch.
- [c21] 21.The apparatus of claim 3, wherein said at least one electrical component comprises at least one of a battery, a microprocessor, a wireless transmitter, a wireless re-

ceiver, a circuit board, an analog-to-digital converter, a communications port and a memory chip.

[c22] 22.The apparatus of claim 1, wherein said housing comprises an attachment lip that is clamped between said first and second components.

[c23] 23.The apparatus of claim 1, wherein said housing is configured as a ring.

[c24] 24.The apparatus of claim 1, wherein said housing further comprises at least one projection, a cavity formed in said at least one projection, and at least one device positioned in said cavity formed in said projection.

[c25] 25.The apparatus of claim 1, wherein said housing further comprises a plurality of projections, each of said projections having a cavity formed therein, and at least one device positioned in each of said cavities.

[c26] 26.The apparatus of claim 1, wherein an end surface of at least one of said first and second components is positioned over said at least one cavity and is sealingly engaged with a surface of said housing.

[c27] 27.The apparatus of claim 1, further comprising at least one indicator light coupled to said housing.

[c28] 28.The apparatus of claim 1, further comprising at least

one display panel coupled to said housing.

[c29] 29.The apparatus of claim 27, wherein said at least one indicator light is coupled to an exterior surface of said housing.

[c30] 30.The apparatus of claim 28, wherein said at least one display panel is coupled to an exterior surface of said housing.

[c31] 31.An apparatus, comprising:
a first component adapted to be positioned in a subterranean hole;
a second component adapted to be positioned in said subterranean hole, the first and second components being threadingly coupled to one another;
a detachable housing, at least a portion of which is positioned between said first and second components, said housing having at least one cavity formed therein; and
at least one device positioned within said at least one cavity.

[c32] 32.The apparatus of claim 31, wherein said at least one device is comprised of a sensor.

[c33] 33.The apparatus of claim 31, wherein said at least one device is comprised of an electrical component.

- [c34] 34.The apparatus of claim 31, wherein said at least one device is comprised of at least one sensor and at least one electrical component.
- [c35] 35.The apparatus of claim 31, wherein said first component comprises at least one of a threaded pipe and a drill bit.
- [c36] 36.The apparatus of claim 31, wherein said second component comprises at least one of a threaded pipe and a drill bit.
- [c37] 37.The apparatus of claim 31, wherein said first and second components are sections of pipe.
- [c38] 38.The apparatus of claim 31, wherein an end surface of said first component and an end surface of said second component engage said housing.
- [c39] 39.The apparatus of claim 31, wherein said housing has a plurality of cavities formed therein.
- [c40] 40.The apparatus of claim 39, wherein at least one sensor is positioned in each of said plurality of cavities.
- [c41] 41.The apparatus of claim 39, wherein at least one electrical component is positioned in each of said cavities.
- [c42] 42.The apparatus of claim 39, wherein at least one sen-

sor and at least one electrical component is positioned in each of said plurality of cavities.

[c43] 43.The apparatus of claim 31, wherein said housing is positioned adjacent an exterior surface of said first component.

[c44] 44.The apparatus of claim 31, wherein said housing is positioned adjacent an interior surface of said first component.

[c45] 45.The apparatus of claim 31, wherein said at least one cavity has at least one of a generally cylindrical configuration and a generally rectangular configuration.

[c46] 46.The apparatus of claim 31, further comprising a cover plate positioned over said at least one cavity.

[c47] 47.The apparatus of claim 31, further comprising at least one passageway extending from said at least one cavity to an external surface of said housing.

[c48] 48.The apparatus of claim 39, further comprising an internal passageway formed in said housing that connects at least two of said plurality of cavities to one another.

[c49] 49.The apparatus of claim 32, wherein said at least one sensor is comprised of at least one of a thermometer, a gyroscope, an accelerometer, a strain gauge, a barome-

ter, a pressure sensor and a hall effect switch.

- [c50] 50.The apparatus of claim 33, wherein said at least one electrical component comprises at least one of a battery, a microprocessor, a wireless transmitter, a wireless receiver, a circuit board, an analog-to-digital converter, a communications port and a memory chip.
- [c51] 51.The apparatus of claim 31, wherein said housing comprises an attachment lip that is clamped between said first and second components.
- [c52] 52.The apparatus of claim 31, wherein said housing is configured as a ring.
- [c53] 53.The apparatus of claim 31, wherein said housing further comprises at least one projection, a cavity formed in said at least one projection, and at least one device positioned in said cavity formed in said projection.
- [c54] 54.The apparatus of claim 31, wherein said housing further comprises a plurality of projections, each of said projections having a cavity formed therein, and at least one device positioned in each of said cavities.
- [c55] 55.The apparatus of claim 31, wherein an end surface of at least one of said first and second components is positioned over said at least one cavity and is sealingly en-

gaged with a surface of said housing.

[c56] 56.The apparatus of claim 31, further comprising at least one indicator light coupled to said housing.

[c57] 57.The apparatus of claim 31, further comprising at least one display panel coupled to said housing.

[c58] 58.The apparatus of claim 56, wherein said at least one indicator light is coupled to an exterior surface of said housing.

[c59] 59.The apparatus of claim 57, wherein said at least one display panel is coupled to an exterior surface of said housing.

[c60] 60.An apparatus, comprising:
a length of pipe;
a drill bit, the length of pipe and the drill bit being threadingly coupled to one another;
a detachable housing, at least a portion of which is positioned between said length of pipe and said drill bit, said housing having at least one cavity formed therein; and
at least one device positioned within said at least one cavity.

[c61] 61.The apparatus of claim 60, wherein said at least one device is comprised of a sensor.

- [c62] 62.The apparatus of claim 60, wherein said at least one device is comprised of an electrical component.
- [c63] 63.The apparatus of claim 60, wherein said at least one device is comprised of at least one sensor and at least one electrical component.
- [c64] 64.The apparatus of claim 60, wherein an end surface of said length of pipe and an end surface of said drill bit engage said housing.
- [c65] 65.The apparatus of claim 60, wherein said housing has a plurality of cavities formed therein.
- [c66] 66.The apparatus of claim 65, wherein at least one sensor is positioned in each of said plurality of cavities.
- [c67] 67.The apparatus of claim 65, wherein at least one electrical component is positioned in each of said cavities.
- [c68] 68.The apparatus of claim 65, wherein at least one sensor and at least one electrical component is positioned in each of said plurality of cavities.
- [c69] 69.The apparatus of claim 60, wherein said housing is positioned adjacent an exterior surface of said length of pipe.
- [c70] 70.The apparatus of claim 60, wherein said housing is

positioned adjacent an interior surface of said length of pipe.

- [c71] 71.The apparatus of claim 60, wherein said at least one cavity has at least one of a generally cylindrical configuration and a generally rectangular configuration.
- [c72] 72.The apparatus of claim 60, further comprising a cover plate positioned over said at least one cavity.
- [c73] 73.The apparatus of claim 60, further comprising at least one passageway extending from said at least one cavity to an external surface of said housing.
- [c74] 74.The apparatus of claim 65, further comprising an internal passageway formed in said housing that connects at least two of said plurality of cavities to one another.
- [c75] 75.The apparatus of claim 61, wherein said at least one sensor is comprised of at least one of a thermometer, a gyroscope, an accelerometer, a strain gauge, a barometer, a pressure sensor and a hall effect switch.
- [c76] 76.The apparatus of claim 62, wherein said at least one electrical component comprises at least one of a battery, a microprocessor, a wireless transmitter, a wireless receiver, a circuit board, an analog-to-digital converter, a communications port and a memory chip.

- [c77] 77.The apparatus of claim 60, wherein said housing comprises an attachment lip that is clamped between said length of pipe and said drill bit.
- [c78] 78.The apparatus of claim 60, wherein said housing is configured as a ring.
- [c79] 79.The apparatus of claim 60, wherein said housing further comprises at least one projection, a cavity formed in said at least one projection, and at least one device positioned in said cavity formed in said projection.
- [c80] 80.The apparatus of claim 60, wherein said housing further comprises a plurality of projections, each of said projections having a cavity formed therein, and at least one device positioned in each of said cavities.
- [c81] 81.The apparatus of claim 60, wherein an end surface of said length of pipe is positioned over said at least one cavity and is sealingly engaged with a surface of said housing.
- [c82] 82.The apparatus of claim 60, further comprising at least one indicator light coupled to said housing.
- [c83] 83.The apparatus of claim 60, further comprising at least one display panel coupled to said housing.

[c84] 84.The apparatus of claim 82, wherein said at least one indicator light is coupled to an exterior surface of said housing.

[c85] 85.The apparatus of claim 83, wherein said at least one display panel is coupled to an exterior surface of said housing.

[c86] 86.A method, comprising:
positioning at least a portion of a detachable housing between an end surface of a first component adapted to be positioned in a subterranean hole and an end surface of a second component adapted to be positioned in said subterranean hole, the housing having at least one cavity formed therein and at least one device positioned within said at least one cavity;
threadingly coupling said first and second components to one another, thereby securing said housing between said first and second components;
positioning said first component, said second component and said housing in said subterranean hole; and
acquiring data using said at least one device after said housing is positioned within said subterranean hole.

[c87] 87.The method of claim 86, wherein said at least one device is comprised of a sensor.

- [c88] 88.The method of claim 86, wherein said at least one device is comprised of an electrical component.
- [c89] 89.The method of claim 86, wherein said at least one device is comprised of at least one sensor and at least one electrical component.
- [c90] 90.The method of claim 86, wherein said first and second components are threadingly coupled to one another.
- [c91] 91.The method of claim 86, wherein said first component comprises at least one of a threaded pipe and a drill bit.
- [c92] 92.The method of claim 86, wherein said second component comprises at least one of a threaded pipe and a drill bit.
- [c93] 93.The method of claim 86, wherein said first and second components are sections of pipe.
- [c94] 94.The method of claim 86, wherein an end surface of said first component and an end surface of said second component engage said housing.
- [c95] 95.The method of claim 86, wherein said housing has a plurality of cavities formed therein.
- [c96] 96.The method of claim 95, wherein at least one sensor

is positioned in each of said plurality of cavities.

[c97] 97.The method of claim 95, wherein at least one electrical component is positioned in each of said cavities.

[c98] 98.The method of claim 95, wherein at least one sensor and at least one electrical component is positioned in each of said plurality of cavities.

[c99] 99.The method of claim 86, wherein said at least one cavity has at least one of a generally cylindrical configuration and a generally rectangular configuration.

[c100] 100.The method of claim 95, wherein said housing further comprises an internal passageway formed in said housing that connects at least two of said plurality of cavities to one another.

[c101] 101.The method of claim 86, wherein said at least one sensor is comprised of at least one of a thermometer, a gyroscope, an accelerometer, a strain gauge, a barometer, a pressure sensor and a hall effect switch.

[c102] 102.The method of claim 87, wherein said at least one electrical component comprises at least one of a battery, a microprocessor, a wireless transmitter, a wireless receiver, a circuit board, an analog-to-digital converter, a communications port and a memory chip.

- [c103] 103.The method of claim 85, further comprising at least one indicator light coupled to said housing.
- [c104] 104.The method of claim 85, further comprising at least one display panel coupled to said housing.
- [c105] 105.The method of claim 103, wherein said at least one indicator light is coupled to an exterior surface of said housing.
- [c106] 106.The method of claim 104, wherein said at least one display panel is coupled to an exterior surface of said housing.